that the rank of forma would be sufficient for it if a formal taxonomic category were shown to be desirable. GRAY HERBARIUM, HARVARD UNIVERSITY.

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REVIEW OF THE GENUS CLADONIA IN THE DISTRICT OF COLUMBIA AND VICINITY

S. F. Blake

In 1931 the late Charles A. Robbins and the writer published[1] an annotated, keyed list of the species of reindeer-moss and related forms then known from the District of Columbia region, a circle of approximately 15 miles radius about the Capitol in Washington, thus including areas in adjacent Maryland (in Montgomery and Prince Georges Counties) and Virginia (Arlington and part of Alexandria and Fairfax Counties). In those days specific distinctions in *Cladonia* were founded mostly on morphological characters with frequent assistance from the color changes brought about by treatment with caustic potash, in some cases supplemented by chloride of lime. Since that time more and more diagnostic importance has come to be attributed to the chemical constituents of the species of *Cladonia*, determined in some cases by the color changes induced by the application of new chemicals, particularly paraphenylenediamine, in others by the shape and color of the microcrystals formed by the evaporation of a solution obtained by extracting dried material of *Cladonia* with acetone or chloroform, then treating with a mixture of glycerine and glacial acetic acid or some similar compound.

[1] Cladonia in the District of Columbia and vicinity. Rhodora **33:** 145–159. pl. 210–212. 1931.

In recent years the leader in the chemical investigation of species of *Cladonia* as well as other lichens has been the Japanese botanist Yasuhiko Asahina. In this country Dr. Alexander W. Evans, for a full quarter-century the leading American student of the genus, has contributed a long series of critical papers and several state *Cladonia* floras based on the most careful study of very extensive collections, in which full consideration has been given to the chemical and microcrystalline characters of the species investigated. All the critical material on which the present paper is based has been named by Dr. Evans and his identifications have been followed throughout, although a phanerogamic botanist can hardly avoid having reservations regarding the specific distinctness of forms distinguished essentially by chemical reactions alone.

Since the 1931 paper was published extensive collections of *Cladonia* have been made by Emery C. Leonard of the U. S. National Herbarium in the District of Columbia region, particularly on Plummers Island, Montgomery County, Maryland,[2] and at a locality, the Patuxent Research Refuge, about 5 miles southeast of Laurel, Prince Georges Co., Maryland, 6 miles east of Beltsville, and approximately 17 miles northeast of the Capitol and so slightly outside the limits adopted in the earlier paper; and some earlier collections by him have been examined. Records from the last-named locality, including two species not at present known elsewhere in the region, have been included in the present list. A few additional specimens have been collected in the region by the writer. All of Mr. Leonard's and my own specimens here recorded, as well as numerous older specimens belonging to critical species, have been identified by Dr. Evans, to whom my best thanks are due for continual assistance of this sort during the past twenty-five years. My whole *Cladonia* herbarium has been deposited in the National Fungus Collections at Beltsville, Md.

Records not given in the 1931 list are distinguished by the addition of the collector's name and date, except that when, as in the case of *C. caroliniana* and *C. grayi*, a specific name has been changed and new infraspecific categories appear, no details are given for them if they are based on material already recorded

[2] E. C. Leonard and E. P. Killip, Natural History of Plummers Island, Maryland. VIII. Lichens. Proc. Biol. Soc. Washington **52**: 23–26. 1939. (Cladoniaceae, p. 25.)

in the 1931 list. Localities are repeated from the earlier list for all species known from not more than three or four localities. The locality "in vicinity of Landover near Bladensburg, Maryland," at which I collected in the '20's several rarities, one of which (*C. floerkeana*) was and still is known from no other spot in the region, has now been obliterated by building operations.

The original list included 36 species, raised to 38 in the present catalog. Four species have been omitted as wrongly identified (*C. coccifera*, *C. impexa*, *C. mitis*, and *C. polycarpia*), six have been added (*C. cryptochlorophaea*, *C. conista*, *C. didyma*, *C. grayi*, and *C. submitis*, as well as *C. atlantica* which is equivalent to some of the named forms of *C. squamosa* in the earlier list), and the names of six have been changed. Two of the additional species are segregates of *C. chlorophaea* and a third (*C. conista*) is intermediate between that species and *C. fimbriata*.

1. **Cladonia rangiferina** (L.) Web. Rare and local; near Prospect Hill, Fairfax Co., Va.; near Lanham, and at Burnt Mills, Md. In addition to the typical form, f. *crispata* Coem. has been collected.

2. **C. sylvatica** (L.) Hoffm. Scarce; recorded in 1931 from near Landover, near Lanham, at Burnt Mills, and Suitland bog, Md., and near Mt. Vernon, Va., and since collected at Patuxent Research Refuge, near Laurel, Md., by Leonard. In addition to the typical form, f. *pygmaea* Sandst. and f. *sphagnoides* (Floerke) Oliv. have been collected.

3. **C. subtenuis** Des Abbayes. (*C. tenuis* (Floerke) Harm. and *C. impexa* Harm. of 1931 list.) Abundant. Forma *condensata* (Floerke) Sandst. and f. *laxiuscula* (Del.) Sandst. of *C. impexa*, recorded in the 1931 list, can be expunged, and the following named form added: *C. subtenuis* f. *cinerascens* (Des Abbayes) Evans: on rocks, near Prospect Hill, Fairfax Co., Va., 1925, *Blake;* sandy pine woods, vicinity of Hyattsville, Md., 1924, *Blake.*

[*C. mitis* Sandst. The single collection on which the 1931 record was based, from near Great Falls, Va., has been examined by Dr. Evans; the specimen is P +, and thus not *C. mitis* as now understood, but it is in too fragmentary condition to be identified. The species should be expunged from the list.]

4. **C. submitis** Evans. Along fence rows, lower end of Patuxent Research Refuge, near Laurel, Md., 1946, *Leonard 21871* and *21872 C.*

5. **C. papillaria** (Ehrh.) Hoffm. Fairly common. Represented by four forms: f. *molariformis* (Hoffm.) Schaer, f. *papillosa* Fr., f. *prolifera* (Wallr.) Schaer (this from Patuxent Research Refuge near Laurel, Md., 1956, *Leonard & Hotchkiss 22351*), and f. *stipata* Floerke.

6. **C. vulcanica** Zolling. f. **minor** Robbins. Rare: Arlington, Va., Prospect Hill, Fairfax Co., Va., Riggs Mills near College Park, Md., and "District of Columbia."

7. **C. didyma** (Fée) Wain. On rotten log in woods, northwest of the buildings, Patuxent Research Refuge, near Laurel, Md., 1946, *Leonard 21736.*

8. **C. floerkeana** (Fr.) Floerke var. **intermedia** Hepp. At a single

locality in vicinity of Landover, near Bladensburg, Md., now destroyed by building operations.

9. **C. bacillaris** (Ach.) Nyl. Common. Most of the material collected is referable to f. *clavata* (Ach.) Wain.

10. **C. macilenta** Hoffm. f. **styracella** (Ach.) Wain. Rare.

[*C. coccifera* (L.) Willd. Recorded in the 1931 list from a single locality in vicinity of Landover, near Bladensburg, where represented by var. *stemmatina* (Ach.) Wain. and var. *phyllocoma* Floerke. Both collections now referred by Dr. Evans to *C. pleurota;* the specimen called var. *phyllocoma* enters var. *frondescens* of that species.]

11. **C. pleurota** (Floerke) Schaer. Not common. In addition to the typical form, the following three forms occur: var. *cerina* (Nagel) Th. Fr., f. *decorata* (Wain.) Evans, and var. *frondescens* (Nyl.) Oliv.

12. **C. cristatella** Tuck. Abundant. Represented by the following forms: f. *beauvoisii* (Del.) Wain., f. *ochrocarpia* Tuck., f. *squamulosa* Robbins, and f. *vestita* Tuck., of the 1931 list; and in addition f. *pleurocarpa* Robbins (Patuxent Research Refuge, near Laurel, Md., 1946, *Leonard 21599* in part) and f. *ramosa* Robbins (clayey soil near edge of pine woods, Battery Park near Bethesda, Md., 1925, *Blake*).

13. **C. incrassata** Floerke. (*C. paludicola* (Tuck.) Merrill of 1931 list.) Rare; Arlington, Va., and vicinity of Landover, near Bladensburg, Md.; also Franklin Park near McLean, Va., 1931, *Leonard 15926 b.* Forma *squamulosa* (Robbins) Evans has been collected at Franklin Park, near McLean, 1932, *Leonard 16214.*

14. **C. uncialis** (L.) Web. Fairly common. The following named forms have been collected: f. *dicraea* (Ach.) Wain., f. *humilior* Fr. (this from Prospect Hill, Fairfax Co., Va., 1925, *Blake*), f. *obtusata* (Ach.) Nyl., and f. *subobtusata* Arn.

15. **C. caroliniana** (Schwein.) Tuck. (*C. boryi* Tuck. of 1931 list.) Rare; Upton Hill, Arlington Co., Va.; vicinity of Landover, near Bladensburg, Md; and southeast of Decatur Heights, Bladensburg, 1931, *Leonard 15949.* The material includes specimens referred by Dr. Evans to the following forms: f. *dilatata* Evans, f. *fibrillosa* Evans, and f. *prolifera* Evans; also f. *tenuiramea* Evans (Patuxent Refuge near Laurel, Md., 1956, *Leonard 22338, 22341a, 22352*).

16. **C. floridana** Wain. Known from only two localities, one (now destroyed) in vicinity of Landover, near Bladensburg, Md., where common, the other near Lanham, Md. The following forms occur beside the typical form: f. *brachiata* Robbins, f. *elegans* Robbins, f. *esquamosa* Robbins.

17. **C. delicata** (Ehrh.) Floerke f. **quercina** (Pers.) Wain. Fairly common.

18. **C. furcata** (Huds.) Schrad. Fairly common. The following varieties and forms occur: var. *pinnata* (Floerke) Wain. f. *foliolosa* (Del.) Wain., var. *pinnata* f. *turgida* (Scriba) Sandst. (Plummers Island, Md., 1936, *Leonard 2606* and *2607*), var. *racemosa* (Hoffm.) Floerke, var. *racemosa* f. *squamulifera* Sandst. (Plummers Island, 1931–42, numerous collections by Leonard and others), var. *racemosa* f. *subclausa* (Sandst.) Evans.

19. **C. squamosa** (Scop.) Hoffm. Common. The following forms occur: f. *denticollis* (Hoffm.) Floerke, f. *levicorticata* (Sandst.) Evans (Patuxent Research Refuge near Laurel, Md., 1956, *Leonard & Hotchkiss* 22382), f. *phyllocoma* (Rabenh.) Wain., f. *sessilis* Robbins, f. *squamosissima* Floerke.

20. **C. atlantica** Evans. (*C. squamosa* f. *levicorticata* m. *rigida* and m. *pseudocrispata* and f. *turfacea* of 1931 list). Fairly common. In addition

to the typical form, f. *ramosa* Evans and f. *subsimplex* Evans (the latter from Patuxent Research Refuge near Laurel, Md., 1946, *Leonard 21832*) have been identified.

21. **C. caespiticia** (Pers.) Floerke. Fairly common.

22. **C. apodocarpa** Robbins. Rather common.

23. **C. capitata** (Michx.) Spreng. f. **imbricatula** (Tuck.) Evans. (*C. mitrula* of 1931 list.) Very common.

24. **C. subcariosa** Nyl. Very common. To the forms reported in 1931, f. *epiphylla* Robbins, f. *evoluta* Wain., f. *pallida* Robbins, and f. *squamulosa* Robbins, should be added f. *ramosa* Dix (Beltsville, Md., 1949, *Blake*).

[*C. polycarpia* Merrill. To be deleted. The single scanty collection from Great Falls, Va., on which the 1931 record was based is indeterminable, but is not *C. polycarpia*, *C. subcariosa*, or *C. clavulifera*.]

25. **C. clavulifera** Wain. Rather scarce. In addition to the typical form (which has been named f. *nudicaulis* Evans), and f. *subvestita* Robbins, f. *pleurocarpa* Robbins has been recorded (Plummers Island, Md., 1933, *Leonard 2223*).

26. **C. brevis** Sandst. (*C. alpicola* var. *karelica* of 1931 list.) Known only from a single somewhat unsatisfactory record, that of two specimens collected by Lehnert in "District of Columbia" and mounted with others of *C. capitata* and *C. subcariosa*. Dr. Evans informs me that he has southern material from Virginia, West Virginia, and North Carolina; all his Virginia specimens come from counties in the mountains except for one from King and Queen County in Tidewater Virginia.

27. **C. pyxidata** (L.) Fr. Scarce. Represented by two named forms, f. *lophyra* (Ach.) Rabenh. and f. *simplex* (Ach.) Harm., both belonging under var. *neglecta* (Floerke) Mass.

28. **C. chlorophaea** (Floerke) Spreng. Although reported in the 1931 list as the commonest and most variable *Cladonia* in the region, *C. chlorophaea* as now restricted by the excision of *C. grayi* turns out to be extremely scarce. All my own specimens, referred to 9 named forms by Robbins, prove to belong to *C. grayi*, a morphologically almost identical species which he did not distinguish from *C. chlorophaea*. The only specimens from the region which Dr. Evans finds referable to *C. chlorophaea* (f. *simplex* (Hoffm.) Arn.) are the following: Near Saegmiller's place, Alexandria Co., Va., 1917, *Mary F. Miller* (locality dubious, perhaps in Arlington Co.); between Anacostia and Twining City, D. C., 1918, *Leonard 134 p. p.*

29. **C. grayi** Merrill. Abundant, practically all the material on which the 1931 listing of *C. chlorophaea* was based now being referred to this species, which scarcely differs except in chemical reaction. In addition to the typical form, Evans identifies the following: f. *carpophora* Evans, f. *cyathiformis* Sandst., f. *squamulosa* Sandst. The species was first recorded by Leonard and Killip in their Plummers Island list.

30. **C. cryptochlorophaea** Asahina. Sligo Creek, Montgomery Co., Md., 1918, *Leonard* 62 p. p.; Plummers Island, Montgomery Co., 1938, *Leonard 2759*.

31. **C. conista** (Ach.) Robbins f. **simplex** Robbins. Sligo Creek, Montgomery Co., Md., 1918, *Leonard* 62 p. p.; vicinity of Great Falls, Va., 1924, *Killip 12447*.

32. **C. coniocraea** (Floerke) Sandst. Fairly common. Three forms occur: f. *ceratodes* (Floerke) Wain., f. *phyllostrota* (Floerke) Wain., f. *truncata* (Floerke) Wain.

33. **C. pityrea** (Floerke) Fr. Scarce; Plummers Island, Md., near Chevy Chase, Md., and near Great Falls, Va. Two forms are known: f. *hololepis* (Floerke) Wain. and f. *subacuta* Wain., both belonging under var. *zwackhii* Wain.

34. **C. mateocyatha** Robbins. Scarce. Besides the typical form, f. *squamulata* Robbins has been collected.

35. **C. verticillata** (Hoffm.) Schaer. Fairly common; the following forms occur: f. *apoticta* (Ach.) Wain., f. *evoluta* (Th. Fr.) Stein, f. *phyllocephala* (Flot.) Oliv., and f. *phyllophora* (Ehrh.) Flot. (the last from Plummers Island, Md. 1907, *B. Fink 103* in part).

36. **C. robbinsii** Evans. (*C. foliacea* var. *alcicornis* of 1931 list.) Known only from rocks at Great Falls, in both Maryland and Virginia.

37. **C. strepsilis** (Ach.) Wain. Common. Three forms have been collected: f. *coralloidea* (Ach.) Wain, f. *glabrata* Wain., f. *subsessilis* (Wain.)S andst.

38. **C. piedmontensis** Merrill. Common. The following forms occur: f. *lepidifera* (Wain.) Robbins, f. *obconica* Robbins, f. *phyllocoma* Robbins, f. *squamulosa* Robbins.—HORTICULTURAL CROPS RESEARCH BRANCH, AGRICULTURAL RESEARCH SERVICE, U. S. DEPARTMENT OF AGRICULTURE, BELTSVILLE, MARYLAND.

MISCELLANEOUS CRUCIFERAE OF MEXICO AND WESTERN TEXAS

REED C. ROLLINS

MOST taxonomists recognize the fact that the flora of certain areas of Mexico and adjacent United States is very inadequately known, but there is only a limited opportunity to help with the task of doing something about it. The lack of study collections is the primary source of difficulty. For several years I have known about a number of new species in the Cruciferae from the area, but I have refrained from describing them because of inadequate material. Now, with more material at my disposal, a small group of these has received attention again, and they are described below.

Thelypodium Paysonii Rollins, sp. nov.

Herbaceous annual or biennial; basal leaves not present; stems branched, densely hirsute with long spreading simple trichomes, 2–4 dm. long; cauline leaves petiolate, pinnate, with the lobes dentate, 3–6 cm. long, 1–3 cm. wide, pilose along petiole and main vein, lobes mostly glabrous, narrowly oblong, markedly dentate; pedicels slender, glabrous, divaricately ascending in flower, spreading at right angles to rachis and slightly curved downward in fruit, 6–9 mm. long; buds broadly clavate; sepals whitish, glabrous, non-saccate, oblong, 3–4 mm. long; petals white, with a long claw, blade spatulate, 1–1.5 mm. across, petals 5–6 mm. long,